

REMARKS

Claims 17, 18, 24, 25, 28, 41 and 43 have been cancelled without prejudice. Applicants reserve the right to pursue the cancelled subject matter in a continuing application.

Applicants thank the Examiner for withdrawing the previous rejection of claims under 35 U.S.C. § 112, second paragraph.

Claims 1-3, 6-12, 14-16, 19-21, 23, 27, 30-32, 37, 39-40 and 42 are pending.

CLAIM REJECTIONS

Rejection of claims under 35 U.S.C. § 103

Perry

The Examiner has rejected claims 1-3, 6-12, 16-21, 23-25, 27-28, 30 and 39-42 under 35 U.S.C. § 103(a) as being unpatentable over Perry et al., *Journal of Dairy Science*, Vol. 80, p. 799-805 (1997) ("Perry"). See Office Action at p. 3. Not in acquiescence to the rejection but in an effort to expedite prosecution, claims 17, 18, 24, 25, 28 and 41 have been cancelled without prejudice thus rendering this rejection moot with respect to those claims. Claims 2-3, 6-12, 16, 19-21, 23, 27, 30, 39-40 and 42 depend from independent claim 1.

The Examiner maintains that "[g]iven Perry et al. disclose lactic acid bacterium, *Streptococcus thermophilus* MR-1C and *Lactobacillus delbrueckii* MR-1R that are capable of producing an exopolysaccharide (EPS) (Abstract, p. 799/Introduction/paragraph 3), it is clear that they intrinsically are capable of producing an enzyme that is capable of producing EPS and fermenting lactic acid." See Office Action at p. 3. Additionally, the Examiner also maintains that "given Perry et al. disclose *Streptococcus thermophilus*, since *Streptococcus thermophilus* strains are known to produce EPS (Abstract, p. 799/Introduction/paragraph 3), it follows that the *Streptococcus thermophilus* MR-1C disclosed by Perry et al. and *Streptococcus thermophilus* V3 could be used interchangeably." Id.

Claim 1 relates to a composition suitable for forming a low fat cheese, the composition including a starter acidification culture and an exopolysaccharide (EPS) fermentation culture wherein the EPS culture contains a viable lactic acid microorganism selected from the group consisting of *Streptococcus thermophilus* V3, *Lactococcus lactis* ssp *cremoris* 322, *Lactobacillus sakei* 570, and *Leuconostoc mesenteroides* 808, wherein the lactic acid

microorganism is capable of producing an enzyme, and wherein the enzyme is capable of producing an EPS.

Perry discloses the production of a low fat mozzarella cheese using:

- (a) *Streptococcus thermophilus* MR-1C, and
Lactobacillus delbrueckii spp. *Bulgaricus* MR-1R; or
- (b) *Streptococcus thermophilus* MR-1C,
Lactobacillus delbrueckii spp. *Bulgaricus* MR-1R,
Lactococcus lactis spp. *lactis* and
Lactococcus lactis spp. *cremoris*;

and that the moisture content was increased compared to the control cheese which in turn increased the melt. See Abstract of Perry. The control cheese was produced using *Streptococcus thermophilus* TA061 and *Lactobacillus helveticus* LH100. See p. 800 of Perry. The milk was pre-acidified with acetic acid before inoculation with the lactic acid bacteria (first paragraph of the right-hand column on page 800 of Perry). In contrast, the milk used to produce the cheese in Example 5 does not need to be pre-acidified (see Figure 13 of the specification which details how the cheese is made).

All of the cheeses in Perry were produced using a strain of *Streptococcus thermophilus*. However, the cheese produced using mixture (b) of lactic acid bacterial strains was moister than the cheese produced using mixture (a) of lactic acid bacterial strains. See p. 800-801 of Perry. Hence, the skilled person would have readily understood that it is the combination of specific strains which makes the difference to the moisture retention of the cheeses.

The difference between Perry and the claimed invention is that the culture includes a lactic acid bacterium selected from the group consisting of *Streptococcus thermophilus* strain V3, *Lactococcus lactis* ssp *cremoris* strain 322, *Lactobacillus sakei* strain 570, and *Leuconostoc mesenteroides* strain 808. As acknowledged by the Examiner, Perry does not disclose *Streptococcus thermophilus* V3 (page 4, last paragraph, of the Office Action). Advantageously, by using the specific strains recited in the claims, surprisingly **low fat** cheeses (such as Danbo) are produced which are not as **rubbery** and not as **insoluble** (i.e. crumbly) as low fat cheeses produced **without** these strains. Consumers are keen to reduce the levels of fat in the foods

which they purchase. The problem solved by the claimed invention is the production of low fat cheeses which do not compromise on the quality of the cheese. Unexpectedly, the claimed invention solves this problem by using a lactic acid bacterium selected from the group consisting of *Streptococcus thermophilus* strain V3, *Lactococcus lactis* spp *cremoris* strain 322, *Lactobacillus sakei* strain 570, and *Leuconostoc mesenteroides* strain 808 in the culture medium. In connection to this, Applicants refer to Example 5 of the specification.

Example 5 shows that using *Lactobacillus sakei* strain 570, a low fat cheese is produced that is not rubbery (page 72, lines 29-32, and Figure 14 of the specification) or insoluble (page 72, lines 26-29 of the specification). Advantageously, the *low fat* Danbo cheese produced in Example 5 has a **similar texture** compared to Danbo 30+ cheese which has **high fat** content (page 71, lines 24-26 of the specification).

Perry clearly teaches the skilled person starter cultures which can be used to produce low fat cheeses which result in the production of cheeses with good moisture retention – cheeses with low moisture retention are rubbery. There is no motivation for the skilled person to consider using any other type of lactic acid bacterial strains in place of those taught in Perry. To assert otherwise would violate the basic considerations of obviousness as set forth in MPEP 2141 (“[t]he references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention.”). If anything, the skilled person would actually be reluctant to alter the strains used.

In particular, there is no motivation for the skilled person to use *Streptococcus thermophilus* strain V3 over and above the plethora of other lactic acid bacterial strains which are known to produce EPS; such as *Streptococcus thermophilus* strain MR-1C, *Lactobacillus delbrueckii* strain MR-1R, *Lactococcus lactis* spp. *lactis* strains and *Lactococcus lactis* spp. *cremoris* strains - which Perry discloses are known to produce EPS and which Perry *et al* actually use to produce low-fat cheese. To assert otherwise is to use impermissible hindsight analysis. Especially since Perry does not even mention *Streptococcus thermophilus* strain V3 or any other strain recited in the claims.

In connection to this, we note that Tallgren *et al.*, *Applied and Environmental Microbiology*, Vol. 65, No. 2, p. 862-864 (1999) discloses 170 bacteria which are capable of producing EPS (see the abstract). Hence, it is clear from this document alone that there is a

plethora of lactic acid bacterial strains which produce EPS. The contribution of the claimed invention to the art is to teach EPS producing lactic acid bacterial strains which are useful in the production of low-fat cheeses.

In connection to claim 11, the Examiner asserted that it would have been obvious to use any strain of *Lactococcus lactis* spp. *cremoris* – including strain 322. However, as acknowledged by the Examiner, Perry does not disclose *Lactococcus lactis* spp. *cremoris* strain 322. See Office Action at p. 5. There is no motivation for the skilled person to use *Lactococcus lactis* spp. *cremoris* strain 322 over and above the plethora of other lactic acid bacterial strains which are known to produce EPS; such as *Streptococcus thermophilus* strain MR-1C, *Lactobacillus delbrueckii* strain MR-1R, *Lactococcus lactis* spp. *lactis* strains and *Lactococcus lactis* spp. *cremoris* strains - which Perry actually discloses are known to produce EPS and which Perry actually uses to produce low-fat cheese. To assert otherwise is to use impermissible hindsight analysis. Especially since Perry does not even mention any one of *Streptococcus thermophilus* strain V3, *Lactococcus lactis* ssp *cremoris* strain 322, *Lactobacillus sakei* strain 570, and *Leuconostoc mesenteroides* strain 808.

Without the teachings of the claimed invention, the skilled person could not and would not have considered using any one of *Streptococcus thermophilus* strain V3, *Lactococcus lactis* ssp *cremoris* strain 322, *Lactobacillus sakei* strain 570, and *Leuconostoc mesenteroides* strain 808 to produce low fat cheeses.

Accordingly, Perry does not teach or suggest the specific strains described in claim 1, i.e. Perry does not teach or suggest a composition suitable for forming a low fat cheese, the composition including a starter acidification culture and an exopolysaccharide (EPS) fermentation culture wherein the EPS culture contains a viable lactic acid microorganism selected from the group that includes *Streptococcus thermophilus* V3, *Lactococcus lactis* ssp *cremoris* 322, *Lactobacillus sakei* 570, and *Leuconostoc mesenteroides* 808, wherein the lactic acid microorganism is capable of producing an enzyme, and wherein the enzyme is capable of producing an EPS.

Since claims 2-3, 6-12, 16, 19-21, 23, 27, 30, 39-40 and 42 depend from independent claim 1, those claims should be patentable over Perry for at least the reasons described above. Applicants respectfully request reconsideration and the withdrawal of this rejection.

Perry and Degeest

The Examiner has maintained the rejection of claims 14 and 32 under 35 U.S.C. § 103(a) as being unpatentable over Perry and Degeest et al., *Journal of Applied Microbiology*, Vol. 91, p. 470-477 (2001) ("Degeest"). See Office Action at p. 7. Claims 14 and 32 depend from independent claim 1.

As previously explained, Perry does not teach or suggest a composition suitable for forming a low fat cheese, the composition including a starter acidification culture and an exopolysaccharide (EPS) fermentation culture wherein the EPS culture contains a viable lactic acid microorganism selected from the group that includes *Streptococcus thermophilus* V3, *Lactococcus lactis* ssp *cremoris* 322, *Lactobacillus sakei* 570, and *Leuconostoc mesenteroides* 808, wherein the lactic acid microorganism is capable of producing an enzyme, and wherein the enzyme is capable of producing an EPS.

This defect is not remedied by Degeest. Degeest discloses that *Lactobacillus sakei* strain 0-1 produces EPS and, moreover, this strain is capable of producing large amounts of EPS (first full paragraph of page 471 of Degeest). Degeest describes culturing *Lactobacillus sakei* strain 0-1 in SDM medium and MRS medium (right-hand column of page 471). Degeest does not disclose culturing *Lactobacillus sakei* strain 0-1 in milk. In addition, Degeest does not suggest the use of the strain in the production of low-fat cheeses. Furthermore, Degeest does not disclose *Lactobacillus sakei* strain 570. In fact, the Examiner acknowledges that Degeest does not disclose *Lactobacillus sakei* strain 570. See Office Action at p. 8. Moreover, Degeest does not teach or suggest that *Lactobacillus sakei* strain 570 could be used to produce low-fat cheese.

There is no motivation for the skilled person to combine Perry with Degeest over and above any other document. As discussed above, Perry relates to the production of low-fat cheeses. Degeest is in a **different field** – namely determining optimal conditions for EPS production of the EPS producing lactic acid bacterium *Lactobacillus sakei* strain 0-1. Even if the skilled person were motivated to combine these documents (which Applicants do not admit to be the case here), the skilled person would still not arrive at the claimed invention.

There is no motivation in either Degeest or Perry for the skilled person to use *Lactobacillus sakei* strain 570 over and above the plethora of other lactic acid bacterial strains

which are known to produce EPS; such as *Streptococcus thermophilus* strain MR-1C, *Lactobacillus delbrueckii* strain MR-1R, *Lactococcus lactis* spp. *lactis* strains and *Lactococcus lactis* spp. *cremoris* strains - which Perry actually discloses are known to produce EPS and which Perry actually uses to produce low-fat cheese - or *Lactobacillus sakei* strain 0-1 which Degeest discloses produces EPS. To assert otherwise is to use impermissible hindsight analysis especially since neither document even mentions *Lactobacillus sakei* strain 570.

In connection to this, Applicants wish to point out that there many *Lactobacillus* species. Kandler and Weiss (*Bergey's Manual of Systematic Bacteriology*, Vol. 22, pp. 1208-34 (1986); copy enclosed at Appendix A) is a review article. The paragraph spanning both columns on page 1208 discloses that about 50 *Lactobacillus* species were known in 1986. Pot and Tsakalidou (*Lactobacillus Molecular Biology*, p. 1-22 (2009); copy enclosed at Appendix B) is a review article describing the taxonomy and metabolism of *Lactobacillus*. Table 2.2 details 113 different Lactobacilli species which are known. Further, Figure 2.1 shows the number of *Lactobacillus* species described each year; this shows that between 2003 and 2008 thirty-nine *Lactobacillus* species were identified. Hence, it is clear that there is a plethora of *Lactobacillus* species.

Without the teachings of the claimed invention, the skilled person could not and would not have considered using any one of *Streptococcus thermophilus* strain V3, *Lactococcus lactis* spp. *cremoris* strain 322, *Lactobacillus sakei* strain 570, and *Leuconostoc mesenteroides* strain 808 to produce low fat cheeses.

Accordingly, since claims 14 and 32 are dependent on claim 1, claims 14 and 32 are patentable over the combination of Perry and Degeest for at least the reasons described above. Applicants respectfully request reconsideration and the withdrawal of this rejection.

Perry and Tallgren

The Examiner has maintained the rejection of claims 15 and 31 under 35 U.S.C. § 103(a) as being unpatentable over Perry and Tallgren et al., *Applied and Environmental Microbiology*, Vol. 65, No. 2, p. 862-864 (1999) ("Tallgren"). See Office Action at p. 8. Claims 15 and 31 depend from independent claim 1.

As previously explained, Perry does not teach or suggest a composition suitable for forming a low fat cheese, the composition including a starter acidification culture and an exopolysaccharide (EPS) fermentation culture wherein the EPS culture contains a viable lactic acid microorganism selected from the group consisting of *Streptococcus thermophilus* V3, *Lactococcus lactis* ssp *cremoris* 322, *Lactobacillus sakei* 570, and *Leuconostoc mesenteroides* 808, wherein the lactic acid microorganism is capable of producing an enzyme, and wherein the enzyme is capable of producing an EPS.

This defect is not remedied by Tallgren. Tallgren discloses the isolation of bacteria from sugar beet. These bacteria are involved in spoilage of the sugar beet. See p. 862 of Tallgren. Some of the bacteria produce EPS but other bacteria do not produce EPS (see the abstract). Tallgren does not disclose culturing any of the lactic acid bacteria disclosed therein in milk – let alone those strains which produce EPS. In addition, Tallgren does not suggest the use of any of the lactic acid bacteria in the production of low-fat cheeses. Furthermore, Tallgren does not disclose *Leuconostoc mesenteroides* strain 808. In fact, the Examiner acknowledges that Tallgren does not disclose *Leuconostoc mesenteroides* strain 808. See Office Action at p. 9. Moreover, Tallgren does not teach or suggest that *Leuconostoc mesenteroides* strain 808 could be used to produce low-fat cheese.

There is no motivation for the skilled person to combine Perry with Tallgren over and above any other document. As discussed above, Perry relates to the production of low-fat cheeses. Tallgren is in a **different field** – namely isolating bacteria from sugar beet. Applicants note that the Examiner asserts that Perry and Tallgren are in the same field of endeavor – namely “EPS producing lactic acid bacteria”.

MPEP 2141.01(a) states that

The examiner must determine what is "analogous prior art" for the purpose of analyzing the obviousness of the subject matter at issue.

**>"Under the correct analysis, any need or problem known in the field of endeavor at the time of the invention and addressed by the patent [or application at issue] can provide a reason for combining the elements in the manner claimed. " KSR International Co. v. Teleflex Inc., 550 U.S.

_____, _____, 82 USPQ2d 1385, 1397 (2007). Thus a reference in a field different from that of applicant's endeavor may be reasonably pertinent if it is one which, because of the matter with which it deals, logically would

have commended itself to an inventor's attention in considering his or her invention as a whole.<

(emphasis added). However, Applicants respectfully submit that the Examiner, using hindsight analysis, has defined the field of endeavor broadly in order to justify combining these documents. The claimed invention is directed to compositions suitable for low fat cheeses. The claimed invention is not directed to "EPS producing lactic acid bacteria" *per se*. Even if the skilled person were to combine these documents (which is denied), the skilled person would still not arrive at the claimed invention. There is no motivation in either Tallgren or Perry for the skilled person to use *Leuconostoc mesenteroides* strain 808 over and above the plethora of other lactic acid bacterial strains which are known to produce EPS; such as *Streptococcus thermophilus* strain MR-1C, *Lactobacillus delbrueckii* strain MR-1R, *Lactococcus lactis* spp. *lactis* strains and *Lactococcus lactis* spp. *cremoris* strains - which Perry actually discloses are known to produce EPS and which Perry actually uses to produce low-fat cheese - or the strains which Tallgren discloses produce EPS. Especially since neither reference even mentions *Leuconostoc mesenteroides* strain 808. To assert otherwise is to use impermissible hindsight analysis. Without the teachings of the claimed invention, the skilled person could not and would not have considered using any one of *Streptococcus thermophilus* strain V3, *Lactococcus lactis* spp *cremoris* strain 322, *Lactobacillus sakei* strain 570, and *Leuconostoc mesenteroides* strain 808 to produce low fat cheeses.

Accordingly, since claims 15 and 31 are dependent on claim 1, claims 15 and 31 are patentable over the combination of Perry and Tallgren for at least the reasons described above. Applicants respectfully request reconsideration and the withdrawal of this rejection.

Degeest

The Examiner has maintained the rejection of claim 37 under 35 U.S.C. § 103(a) as being unpatentable over Degeest. See Office Action at p. 9.

Claim 37 recites a culture of *Lactobacillus sakei* strain 570 deposited as DSM 15889 at the Deutsche Sammlung von Mikroorganismen und Zellkulturen GnbH. The Examiner however, states that "[g]iven Degeest et al. disclose a *Lactobacillus sakei* culture, since *Lactobacillus sakei* strains are known to produce EPS ..., it follows that the *Lactobacillus sakei* 0-1 and

Lactobacillus sakei DSM 15889 are interchangeable.” Id. Applicants respectfully traverse this statement.

Degeest discloses optimizing the production of EPS by *Lactobacillus sakei* 0-1 in order to obtain high amounts of EPS by studying the influence of temperature and carbon source on EPS production. See Abstract. **Nowhere** in Degeest *et al* is the *Lactobacillus sakei* strain 570 taught or suggested. Degeest does not teach or suggest a culture of *Lactobacillus sakei* strain 570 deposited as DSM 15889 at the Deutsche Sammlung von Mikroorganismen und Zellkulturen GnbH. Moreover, there is no motivation in Degeest for the skilled person to identify other strains of *Lactobacillus sakei* over and above strain 0-1 – let alone identify the specific strain 570. *Lactobacillus sakei* strain 570 (deposited as DSM15889) and *Lactobacillus sakei* strain 0-1 are not the same.

Accordingly, claim 37 is patentable over Degeest. Applicants respectfully request reconsideration and the withdrawal of this rejection.

CONCLUSION

For the foregoing reasons, Applicants respectfully request reconsideration and withdrawal of the pending rejections. A petition for an extension of time is attached.

Applicants believe that the claims now pending are in condition for allowance. Should any fees be required by the present Amendment, the Commissioner is hereby authorized to charge Deposit Account **19-4293**.

Respectfully submitted,

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